HEALTH CARE MANAGEMENT

Designing a performance-based payment model for physicians at outpatient clinics contracted with Iran health insurance: a case study from Iran

MOHAMMAD EBRAHIM EGHBALI[1], HASAN ABOLGHASEM GORJI[1,2], JALAL ARABLOO[2], MARIANO MARTINI[3], MASOUD BEHZADIFAR[4], HAMID POURASGHARI[1]
[1] Department of Health Services Management, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran; [2] Hospital Management Research Center, Health Management Research Institute, Iran University of Medical Sciences, Tehran, Iran; [3] Department of Health Sciences, University of Genoa, Genoa, Italy; [4] Social Determinants of Health Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran

Keywords

Performance-Based Payment • Physician Performance • Health Insurance Organization • Pay-for-Performance (P4P) • Health Policy

Summary

Background. *Providing quality healthcare services relies on capable physicians with high performance levels. A performance-based payment system can enhance physician productivity, clinical service quality, and patient satisfaction. This study aimed to design a performance-based payment model for physicians in outpatient clinics contracted with the Iran Health Insurance Organization, tailored to its specific context and structure.*
Methods. *The study employed a mixed-methods approach, combining quantitative and qualitative data collection and analysis. Through a literature review and expert interviews, 47 performance indicators and 18 selection criteria were identified. These indicators were reviewed in expert panels, and 49 questionnaires were used to prioritize them based on health insurance structures. The final indicators were categorized into current, transitional, and desired statuses, aligned with organizational infrastructures.*
Results. *The study identified 24 key indicators, including 9 for general physicians and 13 for specialized physicians. These indicators covered aspects such as the average number of prescribed medications, electronic prescription usage, per capita diagnostic procedures, timely physician presence, patient complaints, work history, guideline adherence, electronic record completion, patient satisfaction, training participation, and test prescription rates. Each indicator was detailed with a title, formula, standard, data collection method, and source.*
Conclusions. *The proposed performance-based payment model, utilizing the selected indicators, can guide physicians toward achieving organizational goals such as cost reduction, process efficiency, and improved patient satisfaction. By clarifying expe tations and assessing various performance dimensions, the model provides a framework for enhancing physician performance and aligning it with the objectives of the Health Insurance Organization. Policymakers can use this model to drive systemic improvements in healthcare delivery.*

Introduction

Justice is an important principle in healthcare in any country. In a fair health system, financial equity must exist [1]. Investment and optimal allocation of resources lead to development, poverty reduction, and achieving the goal of a healthy population in the country [2]. The payment system is one of the responsibilities of human resource management, which oversees all human resource payments in any organization [3]. An unfair and inefficient payment system leads to increased dissatisfaction among employees, resulting in a negative impact on patient care and a decrease in the quality of services provided to patients. In fact, the performance-based payment system relates to financial and non-financial rewards that are fairly paid to human resources in exchange for their work in the organization [4, 5].

From the perspective of managers and employees, rewarding based on performance outcomes is an important aspect of wage management and one of the key strategies for retaining and nurturing talent, which has become common in performance management [6, 7]. In pay-for-performance (P4P), financial incentives focus on two main objectives: first, creating economic motivation to change provider behavior by encouraging high-quality, evidence-based performance. Second, eliminating the negative effects of existing reimbursement systems that consider the volume of services rather than their value [8, 9].

Traditional payments, such as fee-for-service (FFS), lead to induced demand and overuse of services. In contrast, managed care, such as capitation payment systems, results in underutilization of healthcare services [5]. Studies show that the number of performance-based payment programs in healthcare systems worldwide is increasing (from 37 in 2003 to 174 in 2007) [10]. In the United States, the United Kingdom, Australia, and Canada, P4P is used as a basis for medical payments [11-14].

However, P4P is not without flaws and negative consequences. In some cases, its implementation has led to a reduction in the quality of certain services and the creation of inequality [2]. Major disadvantages of

https://doi.org/10.15167/2421-4248/jpmh2025.66.1.3497

this system include inequity in the health sector, some adverse health outcomes, and the potential increase in healthcare costs [15]. Given the necessity and importance of improving the quality, effectiveness, and efficiency of services provided by physicians through the P4P system, designing a practical model for performance-based payment is essential [16, 17]. Therefore, this article aims to examine the current payment situation in Iran and provide a performance-based payment model for physicians in outpatient clinics contracted with the Iranian Health Insurance Organization.

Methods

This research is developmental-applied in terms of its objective and a qualitative and documentary study in terms of methodology. The documentary method is considered one of the unobtrusive and non-reactive measures. In the documentary method, documents are regarded as a social reality. These documents can include statistical data or descriptions of the formal operations of an activity. The difference between the documentary method and "facts recording" is that this collection is conducted based on a theoretical framework. In the documentary method, the unit of analysis can include reports and organizational notes, censuses, official rulings, and so on.

To examine various performance-based payment models in different countries, a review study was conducted. In this search, the review methods and eligibility criteria were predetermined. A checklist was used to prepare the review report. Observational studies, before-and-after studies, time series studies, experimental studies, randomized trials, interpretations, and editorials were excluded from the review. Final keywords were identified and selected through mesh and pilot searches. The search for articles was based on keywords such as "performance-based payment", "quality-based payment", "outcome-based payment", "value-based payment", "performance evaluation indicators" and "quality assessment indicators", These keywords were searched in databases like Scopus and PubMed, Google Scholar, the Google search engine, as well as on websites of the World Bank, the Ministry of Health, OECD, and WHO. The inclusion criteria for the study included all articles and documents published between 2000 and 2023 related to performance-based payment in selected countries. The criteria for countries' inclusion in the study included the type of health insurance system, the extent of performance-based payment system utilization, and the economic development status of the countries.

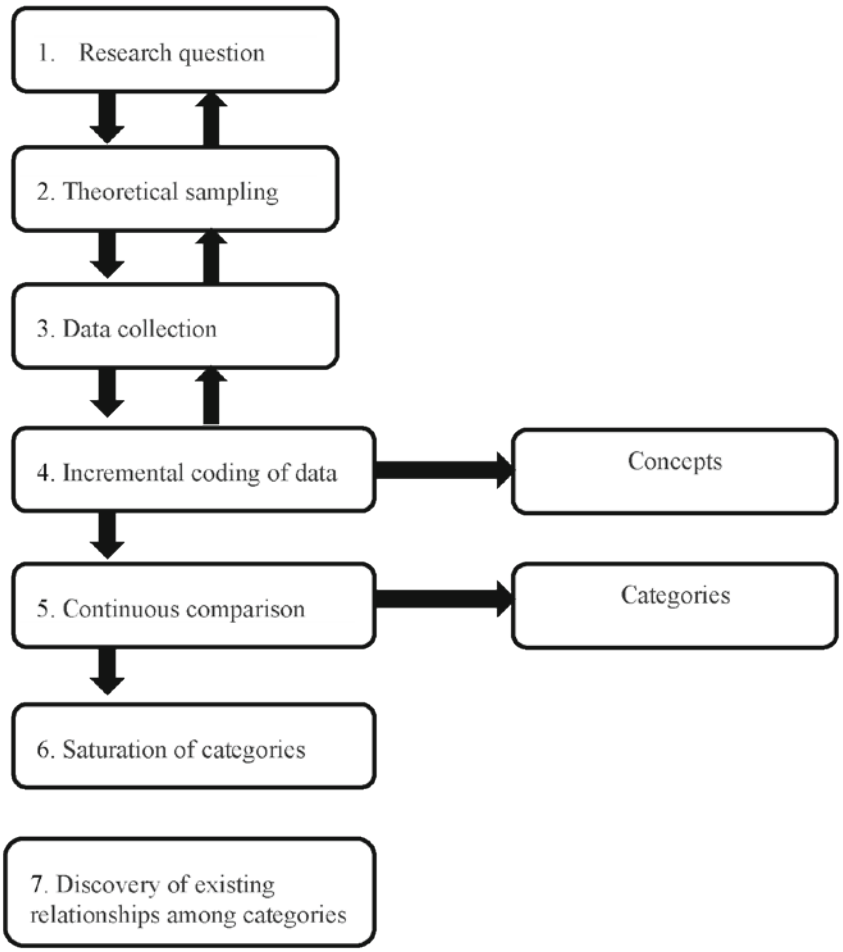
Related articles were screened in two ways: in the first stage, titles and abstracts were independently reviewed by two experts based on the eligibility criteria for the review. In the second stage, the full texts of the articles were screened independently by two experts to identify qualifying articles. Ultimately, data such as study type, context, dimensions and performance criteria, P4P results, and payment strategies were extracted and entered into the data checklist. The statistical population of this research included all managers, policymakers, physicians, and specialists in the field of performance-based payment with at least three years of relevant work experience related to the study's objective. The sample size was determined based on theoretical saturation of the data [18]. In this study, interviews continued until repetitive relationships among components or repetitive elements were established, ultimately achieving theoretical saturation with a sample size of 18 individuals. The sampling method in this research was purposive and incremental, meaning that the researcher gradually performed the coding process from the very first interview after purposefully selecting the samples [19]. The data collection tool was a semi-structured interview with three main specific questions: 1. In your opinion, what indicators should be considered for performance-based payment to physicians in outpatient clinics contracted with health insurance? Which indicators are more important in our country? 2. What criteria should be considered in the final selection of key performance-based payment indicators for physicians? 3. How is the data related to the indicators collected? The implementation method and the stages of information collection were based on several main steps, as shown in Figure 1.

To ensure the validity and reliability of the research, the Lincoln and Guba evaluation method was used [20]. Based on this method, four criteria were considered for assessment: reliability, credibility, transferability, and verification.

The actions taken in the present research to ensure reliability or validity include: 1. Allocating sufficient time for each interview (an average of 45 minutes was dedicated to each interview in this study); 2. Utilizing several experts to validate the research process (the full text of the interviews along with initial coding and categorization was sent to two research method professors and statistical experts, and the full text of two interviews with coding was sent to two specialists in this field. Additionally, throughout all stages of the work, the supplementary opinions of the professors were used for implementation, coding, and extracting initial categories); 3. Employing two expert coders in the field of interviewing to ensure relative consistency of the coders' opinions (the Kappa coefficient obtained for the two codings in this research was 0.0019 = Kappa, 0.771 = Sig, and a suitable agreement coefficient between the two codings was confirmed based on being within the range of 0.6-0.8); 4. Using clear and objective questions (for this purpose, the interview text and extracted codes were presented to the interviewees shortly after, and they expressed their opinions on the accuracy and validity, with discrepancies corrected if necessary).

To facilitate transferability, a clear description of the context, selection method, and characteristics of the participants, as well as the data collection and analysis process, was initially provided so that the audience could apply the findings in other situations. Additionally, by providing detailed findings, efforts were made to

Fig. 1. Qualitative Analysis of Interviews (from Pope C, Ziebland S, Mays N. Qualitative research in health care. Analysing qualitative data. BMJ 2000;320:114-6. https://doi.org/10.1136/bmj.320.7227.114).



increase transferability [21]. For verifiability, a complete description of the research stages, including data collection, analysis, and theme formation, was provided so that the audience could audit the research. The process of conducting the work was also shared with several technical colleagues for verifying the accuracy of the research method.

In this study, three methods were used for reliability: 1. Structured processes (convergent interviewing); 2. Organizing structured processes (systematic recording, writing, and interpreting data); 3. Using a guiding committee to evaluate and conduct interviews (in this research, the opinions of two experts in performance-based payment and qualitative methodology, as well as a statistician in the humanities, were utilized). Nvivo12, a qualitative data analysis software, was used to determine codes and main themes and to provide graphical models. It is worth mentioning that in this research, maintaining the identity and organizational information and ensuring confidentiality in executing the interview content were considered ethical considerations based on the research protocol, along with obtaining informed written consent.

Results

The aim of this study was to identify performance-based payment indicators for physicians, select individuals, and ultimately design a performance-based payment model for doctors. To this end, we first examined various payment models in selected countries and extracted relevant indicators. Then, to complete the indicator forms and identify suitable indicators for Iran, interviews were conducted with experts in this field. After finalizing the indicators, the profile of each indicator was established using a panel of experts. The findings showed that men (77%) participated in the study nearly three times more than women (23%). More than half of the interviewees (experts) were in the age range of 40 to 50 years. Over half of them were in academic management and had more than 10 years of work experience. 83% of the expert group held a doctoral degree or higher and were working in managerial positions, and most had undergone training on performance-based payment systems. The descriptive characteristics of the experts who were interviewed are also presented in Table I. Interviewees were selected from groups of hospital managers, university professors, policymakers, and

Tab. I. Demographic Characteristics of Informed Interviewees.

Research Community Characteristics		Frequency	Percentage
Gender	Male	14	77
	Female	4	23
Education level	Master's Degree	3	17
	Doctorate	3	17
	General Physician	4	22
	Specialist and Sub-specialist	8	44
Job Position	Physician	4	22
	Faculty Member	7	39
	Hospital Director	2	11
	Head of the National Health Insurance Research Center of Iran	1	5
	Deputy of the General Directorate of Treatment of the Imam Khomeini Relief Committee	1	5
	Deputy of the Planning and Policy Office of the Health Insurance Organization	1	5
	Head of Tariff Group, Supreme Council of Insurance Secretariat	1	5
	University Budget Manager	1	5
Work Experience	Under 5 years	1	5
	5-10 years	8	44
	11-15 years	5	28
	Over 16 years	4	22
Organization	Hospital	9	50
	University of Medical Sciences	5	28
	Health Insurance Organization of Iran	1	5
	Imam Khomeini Relief Committee	1	5
	Health Insurance Research Center	1	5
	National Institute for Health Research	1	5

physicians. In total, interviews were conducted with 18 individuals.

Based on a review study of performance-based payment programs in selected countries, as well as the conducted interviews, 47 indicators were extracted as initial payment indicators. Then, in the expert panel, the final indicators were selected using pairwise comparison, and less important indicators and those unsuitable for the current health system in Iran were eliminated. Ultimately, 24 indicators were chosen as the main and influential indicators for the performance-based payment program for physicians. The initial indicators extracted from the articles and interviews are presented in Table II.

Determining Final Indicators and Criteria for Prioritization

After identifying the initial indicators from studies and interviews, a final review, refinement, and specification of the indicators and criteria for prioritization were discussed in the expert panel using a decision-making matrix. In this session, the indicators and criteria derived from previous stages were presented case by case by the researchers, and the opinions of the panel members were collected. By examining the criteria extracted from the literature review and interviews in the expert panel, the criteria were aligned with the CREAM, RAVES, and SMART frameworks. CREAM stands for Clear, Relevant, Economical, Adequate, and Monitorable criteria; RAVES stands for Reliable, Appropriate, Valid, Easy, Accessible, and Sensitive criteria; and SMART stands for Specific, Measurable, Achievable, Relevant, and Time-bound criteria. Ultimately, four criteria were selected with the approval of the panel members, which were relevance, measurability, clarity, and high importance, urgency, and sensitivity (Tab. III). Additionally, it was determined in this session that indicators achieving at least 75% of the total score would be selected as the final performance-based payment indicators for general and specialized physicians.

Finally, after the conducted reviews, the indicators were examined in terms of their relevance to the subject and consideration of local conditions, resulting in 24 indicators entering the next stage for prioritization. After determining the final indicators and criteria for performance-based payment for physicians in the expert panel, a questionnaire was distributed between two separate groups for prioritizing performance-based payment indicators for general practitioners and specialists in outpatient clinics. The questionnaire was sent to 30 individuals from each group, including policymakers, informed individuals, and experts in health insurance, general practitioners, specialists, and professors from medical universities, resulting in a total of 48 completed questionnaires.

The questionnaire contained 24 indicators in rows and 4 criteria in columns, where the score for each indicator was determined based on the specified criteria in this

Tab. II. Indicators Extracted from Articles and Interviews.

Indicators from Interviews	Indicators from Articles	Common Indicators
Number of prescribed medications	Management of chronic diseases and continuity of care	Patient satisfaction
Number of patient referrals to paraclinics	Households covered without tobacco use	Work history
Type of patients based on age	Counseling for smoking and alcohol cessation (lifestyle)	Timely determination of patient status
Location of the clinic or consideration of deprived areas	Optimization of interventions in terms of cost and efficiency	Alignment of diagnostic and therapeutic methods used by the physician with guidelines
Amount of education provided to the patient	Provision of comprehensive care	Number of services provided
Enhancement of the physician's educational level	Quality of on-call service and responsiveness	Duration of consultation and visit
Credentialing of physicians or their ranking	Patient safety	Clinical outcomes
Costs incurred by the patient based on medications	Ability to utilize electronic facilities	Time to access the physician and timely presence
Number of return visits to the physician with the same complaint (pain)	Completion rate of electronic medical records	Promotion of preventive care and primary care
Rate of complaints resolved	Holding professional certifications	Participation in care networks and teamwork
Adherence to professional ethics	Type of services provided	Collaboration in accreditation and quality improvement
Number of complex cases treated		
Facilities and equipment of the clinic		
Monitoring of physician performance		

Tab. III. Description of the Criteria for Selecting Performance-Based Payment Indicators for Physicians.

Row	Criterion Title	Criterion Description
1	Relevance	• The degree of relevance of the indicator to the quality and efficiency of the services provided • The degree of relevance of the indicator to the goals of the Health Insurance Organization
2	Measurability	• The degree of complete and accurate availability of data for the indicator at a reasonable cost (availability of indicator data) • The degree of relative ease in collecting data and measuring the indicator • The degree of ease in analyzing the data of the indicator • Achievable/implementable
3	Clarity, transparency, and comprehensibility	• Being understandable, clear, and evident • Clarity
4	Importance, urgency, and high sensitivity	• Immediate attention is needed from managers and policymakers. • Has a high impact on achieving the goals of the Health Insurance Organization

questionnaire, ranging from 1 to 5. The number 5 indicated the highest alignment of the indicator with the desired criterion, while the number 1 indicated the lowest alignment. To calculate the score given to each indicator, based on the expert panel's opinion, the criterion of relevance was assigned a weight of 1.5, and the other three criteria were assigned a weight of 1. From the total scores given, the score for each indicator was calculated. In Table IV, the prioritized indicators for performance-based payment to general practitioners are presented in order of importance, priority, and based on the average final score.

As previously stated, according to the agreement in the expert panel, indicators that have achieved at least 75% of the total score are selected as final indicators for performance-based payment to general practitioners. Given that the maximum average final score achievable for each indicator is 22.5 points, for performance-based payment to contracted specialist physicians of the health insurance, each selected indicator must achieve a minimum of 16.87 points. Therefore, the 9 specified indicators in Table IV were selected.

According to the agreement in the Expert Panel, the indicators that have earned at least 70% of the total score have been selected as the final performance-based payment indicators for specialized physicians. Considering that the maximum average final score achievable for each indicator is 22.5 points, for performance-based payment to specialized physicians contracted with the Health Insurance, each selected indicator must achieve at least 15.75 points. Therefore, the 13 indicators specified in Table V were selected.

Determining the stage of implementing the indicators

To implement the performance-based payment plan for general and specialized physicians contracted with Health Insurance, the readiness of the necessary

Tab. IV. Final indicators for performance-based payment to general practitioners based on priority.

Row	Indicator	Average final score	Index Selected	Row	Indicator	Average final score	Index Selected
1	Timeliness of the physician's presence at the service location	18.98	✓	13	Ability to utilize electronic facilities	16.79	_
2	Complaints (received) against the physician	18.74	✓	14	Complicated cases treated (*e.g.*, special patients) by the physician	16.73	_
3	Adherence to guidelines in physician decision-making (percentage of unnecessary services)	18.44	✓	15	Quality of services	16.69	_
4	Completion of electronic medical records for the patient	18.14	✓	16	Location of the clinic or consideration of underprivileged areas	16.63	_
5	Patient satisfaction	18.06	✓	17	Percentage of prescribed procedures and medications unrelated to specialty	16.2	_
6	Participation in courses provided by insurance organizations	17.92	✓	18	Average prescription cost per physician	16.08	_
7	Electronic prescriptions recorded and sent on time	17.71	✓	19	Per capita number of procedures	15.82	_
8	Average number of prescribed medications within a specified time frame	17.14	✓	20	Amount of education provided to the patient	15.8	_
9	Physician's work history	17.14	✓	21	Providing systematic explanations in referring patients to other specialties	15.36	_
10	Time allocated for visits	16.86	_	22	Percentage of generic medications to total prescribed medications	14.23	_
11	Average number of tests prescribed within a specified time frame	16.81	_	23	Type of patients visited based on age	14	_
12	Per capita number of services provided by the physician	16.81	_	24	Degree of use of previous diagnoses and opinions from other physicians	11.89	_

infrastructure and facilities is essential. Currently, data and facilities for data collection and implementation of some indicators are available, and for others, they can be provided in the future. For this purpose, in the questionnaire sent to specialists, they were asked to categorize each of the indicators into one of the three stages: current conditions, transitional conditions, and desirable conditions, based on the readiness status of the Health Insurance Organization and the existing infrastructure in the country. The three stages are described in Table VI.

At this stage, based on the determination of the final indicators, the operational model that includes the identification of the indicators was developed using the information obtained from previous stages. The indicator identification includes details such as the title of the indicator, stage of implementation (desirable, feasible, and transitional conditions), standard of the indicator, method of measurement, type, and source of data. To identify the sections of this identification, reports, literature reviews, and interviews conducted with key experts were used. Table VII shows the identification of performance-based payment indicators for general physicians. Table VIII presents the developed indicators for performance-based payment for specialized physicians contracted with Iran's Health Insurance.

Discussion

The implementation of P4P programs in healthcare service delivery has yielded desirable results in most conditions, especially in cost management, preventive care, and increasing the efficiency and quality of services. The adoption of other interventions such as coaching, training, reminders, etc., in line with P4P has recently been welcomed by payers and healthcare providers, and in most cases, it has led to positive outcomes. P4P has been implemented in various ways through different designs, but the results of P4P vary with each design. Therefore, it is not easy to conclude which P4P design is appropriate. P4P has shown encouraging results in most implemented programs.

Various P4P studies worldwide have considered different

Tab. V. Indicators and criteria for performance-based payment to specialist physicians based on priority.

Row	Indicator	Average final score	Index Selected	Row	Indicator	Average final score	Index Selected
1	Adherence to guidelines in physician decision-making (percentage of unnecessary services)	17.86	✓	13	Average number of prescribed medication items	15.92	✓
2	Electronic prescriptions recorded and sent on time	17.74	✓	14	in a specific time period	15.73	_
3	Completion of electronic medical records for the patient	17.74	✓	15	Location of the clinic or consideration of underserved areas	15.59	_
4	Per capita number of prescribed diagnostic procedures (expensive) within a specified time frame	16.86	✓	16	Doctor's work experience	15.51	_
5	Complaints received against the physician	16.78	✓	17	Quality of services	15.48	_
6	Timeliness of physicians' presence at the service location	16.69	✓	18	Percentage of generic medications to total prescribed medications	15.41	_
7	Average number of tests prescribed within a specified time frame by the physician	16.67	✓	19	Percentage of procedures and unrelated medications prescribed	15.17	_
8	Time allocated for visits	16.57	✓	20	Participation in the courses scheduled by the Health Insurance Organization	15.09	_
9	Patient satisfaction	16.45	✓	21	Providing systematic explanations for referring patients to others	14.95	_
10	Per capita number of services provided by the physician	16.23	✓	22	Level of education and communication with patients	14.86	_
11	Complicated cases treated (*e.g.*, special patients) by the physician	16.18	✓	23	Ability to utilize electronic resources	12.98	_
12	Average prescription cost per physician	16.05	✓	24	Type of patients visited based on age	11.59	_

Tab. VI. Description of the three stages for implementing the selected indicators.

Row	Title of the stage	Description
1	Current conditions (Status quo)	Given the existing infrastructure, this indicator can be used in the implementation of the performance-based payment model
2	Transitional conditions (Transient)	The necessary infrastructure for utilizing this indicator in the implementation of the performance-based payment model is being established
3	Desirable conditions (Ideal)	The necessary infrastructure for utilizing this indicator in the implementation of the performance-based payment model is not available but needs to be created

dimensions and performance indicators. Mehrotra Ateev focused on indicators such as reviewing prescribed medications, patient satisfaction surveys, the use of information technology, preventive care, screening, and chronic disease management [22]. The three primary indicators mentioned in this study align with our selected indicators. In examining the performance-based payment scheme in New Zealand conducted by Linda Marie and her colleagues in 2016, service volume, waiting times, the number of acute and chronic patients, patient satisfaction, smoke-free households, and youth access to healthcare services were introduced as selected indicators [23]. Several of the selected indicators and criteria in this study align with our chosen indicators. One common issue in clinics and medical offices is the long waiting time for receiving services, primarily due to physicians not being present on time. Glickman et al., Sika, and Orthok identified waiting time as an impactful indicator for measuring physician performance in their studies [24-26]. In this study, this indicator is also named as the first and most important indicator for performance-based payment.

Habicht et al., identified the use of electronic medical systems as an effective indicator for performance-based payment in their studies [27]. The current study also emphasizes the completion of electronic medical

Tab. VII. Identification of performance-based payment indicators for general physicians in outpatient clinics contracted with Health Insurance.

Indicator title	Index formula	Implementation stage	Standard	Data collection source
Average number of prescribed medication items within a specified time frame	Numerator: Number of medication items prescribed in all prescriptions issued by the physician within a specified time frame Denominator: Total number of prescriptions issued by the physician within a specified time frame	Present	The recommended figure by the World Health Organization is a maximum of 1.8 medication items per prescription	Electronic prescriptions
Electronic prescriptions registered and sent on time	Numerator: Number of electronic prescriptions registered without errors and on time Denominator: Total number of prescriptions by the physician within a specified time frame	Transitive	Range to be determined by the organization (High - Medium - Low)	Creating a suitable dashboard
Per capita number of diagnostic procedures (expensive) prescribed within a specified time frame	Numerator: Number of expensive diagnostic procedures prescribed within a specified time frame Denominator: Total number of patients visited by a physician		Range to be determined by the organization	Electronic prescriptions
Timely presence of the physician at the service delivery location	Average monthly delay time of the physician in arriving at the service delivery location		Range to be determined by the organization	To extract this data from the attendance system (Timex).
Complaints (received) against the physician	Number of complaints registered against the physician within a specified time frame		Range to be determined by the organization	Number of complaints registered in the Medical Crimes Prosecutor's Office, the Organization for the Protection of Medical Professionals, the 1590 system, the 1690 system, and also the number of complaints registered by patients at the treatment center
Physician's work experience	Number of years active as a physician		Range to be determined by the organization	Insurance records
Adherence to guidelines in the physician's decision-making	Numerator: Number of treatment decisions based on guidelines made by the physician Denominator: Total number of treatment decisions made by the physician within a specified time frame	Desirable	Range to be determined by the organization	Creating a suitable dashboard
Completion of electronic medical records for patients	Numerator: Number of electronic records completed by the physician within a specified time frame Denominator: Total number of electronic records that the physician should complete within a specified time frame		Range to be determined by the organization	HIS
Patient satisfaction	Numerator: Number of patients visited with satisfactory consent within a specified time frame Denominator: Total number of patients visited within a specified time frame		Range to be determined by the organization	Questionnaire - System
Participation in training courses provided by insurance organizations	Numerator: Number of approved courses that the physician participated in within a specified time frame Denominator: Total number of approved courses specific to the physician within a specified time frame		Range to be determined by the organization	Continuing education system

Tab. VIII. Identification of performance-based payment indicators for specialist physicians in outpatient clinics contracted with health insurance.

Index Title	Index Formula	Application Stage	Standard	Data Collection Source
Average number of tests prescribed in a given period by a physician	Numerator: Number of tests prescribed by the doctor in a given time period Denominator: Total number of prescriptions by the doctor in a given time period	Present	Cut-off to be determined by the organization	Electronic copies
Complex cases treated (*e.g.*, specific patients) by a physician	Numerator: Number of complex cases treated by the doctor in a given time period Denominator: Total cases visited		Range to be determined by the organization	Electronic copies
Average number of pharmaceutical items prescribed in a given period	Numerator: Number of prescribed medications in all prescriptions issued by the physician in a specified time period Denominator: Total number of prescriptions issued by the physician in a specified time period		The recommended number by the World Health Organization is a maximum of 1/8 of a drug per prescription.	Electronic copies
Electronic prescriptions recorded and sent on time	Numerator: Number of electronic prescriptions recorded without errors and on time. Denominator: Total number of physician prescriptions in a specified time period	Transitive	Range to be determined by the organization	Creating a suitable dashboard
Per capita number of diagnostic procedures	Numerator: Number of expensive diagnostic procedures prescribed in a given time period Denominator: Total number of patients seen by a physician		Range to be determined by the organization	Electronic copies
(Expensive) prescribed in a given period	Average monthly delay time of a doctor in entering the service area		Cut-off to be determined by the organization	To extract this data from the attendance system (Timex)
Timely presence of physicians at the service location	Number of complaints registered against a doctor in a specific time period		Range to be determined by the organization	To extract this data, the attendance system (Timex) should be used
Complaints (received) from the physician	Numerator: Number of services provided by the physician in a specified time period Denominator: Number of visits performed by the physician in a specified time period		Range to be determined by the organization	The number of complaints registered with the Medical Crimes Prosecution Office, the Penal Organization, the Medical System Organization, the 1590 system, the 1690 system, as well as the number of complaints registered by employers and clients in the medical center
Per capita number of services provided by the physician	Numerator: Number of guideline-based treatment decisions made by the physician Denominator: Total number of treatment decisions made by the physician in a given time period	Desirable	Range to be determined by the organization	Electronic copies
Adherence to guidelines in medical decision-making	Numerator: Number of electronic records completed by the physician in a given time period Denominator: Total number of electronic records that the physician must complete in a given time period		Range to be determined by the organization	Creating a suitable dashboard
Completion of patient electronic medical records	Numerator: Number of patients visited with satisfactory satisfaction in a given time period. Denominator: Total number of patients visited in a given time period		Range to be determined by the organization	HIS
Average cost of prescriptions per physician	Deductible: The cost of services, drugs, and equipment issued in all prescriptions prescribed by a physician during a specified period of time Deductible: The total number of prescriptions prescribed by a physician during a specified period of time		Cut-off to be determined by the organization	Electronic copies

▶

Tab. VIII *(follows)*. Identification of performance-based payment indicators for specialist physicians in outpatient clinics contracted with health insurance

Index Title	Index Formula	Application Stage	Standard	Data Collection Source
Average cost of prescriptions per physician	Deductible: The cost of services, drugs, and equipment issued in all prescriptions prescribed by a physician during a specified period of time Deductible: The total number of prescriptions prescribed by a physician during a specified period of time.		Cut-off to be determined by the organization	Electronic copies
Time allocated for visits	Numerator: Total time spent by a doctor visiting patients in a given time period Denominator: Total number of patients visited by a doctor in a given time period.		Specialist: 20 minutes Subspecialist: 25 minutes Psychiatrist: 30 minutes	Questionnaire-System

records as one of the important indicators for payments to contracted physicians under health insurance. Patient satisfaction holds special importance from various aspects. Dissatisfied patients are less likely to follow physician instructions and use medications correctly. Eijankaar, Kraut, and Chalmers, as well as Dennis and Marie and their colleagues, have shown in their studies that patient satisfaction is one of the important indicators for performance-based payment [23, 28-30]. In the present study, this indicator is also listed among the most important indicators.

Work experience, which reflects a physician's experience, indicates the number of years a physician has gained expertise in their specialty. Pali and Jinor found that the clinical efficiency of experienced physicians improves. Mohtashami and Tayebi also used work experience as a practical and effective indicator for performance-based payments to employees in an industrial company in their study [31]. Another finding of this study was participation in training courses related to insurance organizations, aimed at enhancing and updating medical knowledge. A study by Ghaebi et al. aligns with this topic, showing that the evaluation indicator for training courses and curricula received the highest score among other evaluation indicators [32].

Logical prescribing of tests and medications means selecting appropriate tests and medications for the suitable patient. Failure to adhere to logical prescribing can lead to threats such as deviations in the diagnostic and treatment processes, compromising patient safety, increased healthcare costs, and higher morbidity and mortality rates. Therefore, this indicator can effectively control physician prescriptions and reduce unnecessary costs by impacting performance-based payments. According to the World Health Organization, rational drug prescribing means prescribing and using medications that are appropriate to the clinical needs of the patient [10]. A study conducted by Izadi et al. showed that as physicians' experience increases, the cost of prescribing tests and medications also rises [33]. This indicator was also among the important indicators identified by experts participating in this study for the performance-based payment scheme in Iran.

Patient complaints and dissatisfaction with treating physicians due to violations and diagnostic and therapeutic errors in healthcare services are common. Gravel, Peterson, and Habicht identified complaints against physicians as one of the important indicators in performance-based payment systems in their studies [27, 34, 35]. Additionally, Forstater noted that a lack of mutual understanding between patients and physicians is one of the main factors leading to complaints against doctors [36]. The results of these studies and the current study indicate that paying attention to the level of complaints against physicians and reducing these complaints can serve as an important indicator for performance-based payments to physicians in health insurance organizations. Physicians make medical care decisions on behalf of patients; therefore, they may unnecessarily increase patient demand. Physicians do not always fulfill their representative role correctly, and their recommendations can be influenced by personal interests. Behbahani et al. stated in their study that the most important way to reduce physician-induced demand is to fully implement a family physician-based referral system in the country [37]. The results of the current study also indicate the degree of adherence to guidelines in physicians' decision-making and the percentage of unnecessary services induced by physicians to patients as an important indicator for performance-based payment.

Conclusions

Providing financial incentives can be seen as a tool for enhancing motivation for efficiency. Performance-based payment is considered a specific type of strategic purchasing that is exclusively used to reward the achievement of predetermined goals. Policymakers in insurance organizations can utilize payment mechanisms for physicians to encourage desired behaviors aligned with their organizational objectives. Identifying and clarifying the indicators and criteria for payments to healthcare providers can assist stakeholders and responsible parties in implementing their desired programs through these indicators. The identified

indicators should be examined from various aspects and piloted. Introducing these indicators and explaining their importance to target groups regarding the quality of services provided, patient satisfaction, and most importantly, their compensation can play a significant role in the implementation of these indicators. However, it seems that the long-term execution of this program may also lead to unintended consequences. Previous studies have pointed to issues such as neglecting other important duties, reporting changes instead of actual activity changes, individuals becoming dependent on financial incentives, and a decline in intrinsic motivation. To prevent such operational barriers and potential issues related to favoritism, it appears essential to have continuous evaluation and timely feedback. This can be achieved by designing performance evaluation dashboards with defined indicators in hospital information systems and considering these indicators as criteria for assessing the quality of services provided, as well as the performance of physicians, routinely evaluated by hospital officials or external organizations, thereby mitigating such problems.

Ethical approval

This study was approved by the Ethics Committee of Iran University of Medical Sciences (code: IR.IUMS.REC.1399.407).

Funding

This study was part of a doctoral thesis supported by the School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran (IUMS/SHMIS-98-3-37-16007).

Conflicts of interest statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Authors' contributions

Conceptual design of the study: HP and MEE. Data analysis: HP and HAG. Drafting the manuscript: MEE and HP and HAG. Performed a search of the literature: HP, MEE, and MM**.** Editing: MB, MM. Critical revision of the manuscript: JA, and MB. All authors have read and approved the latest version of the paper for publication.

References

[1] Eldridge C, Palmer N. Performance-based payment: some reflections on the discourse, evidence and unanswered questions. Health Policy Plan 2009;24:160-6. https://doi.org/10.1093/heapol/czp002.

[2] Jabbari A, Shaarbafchi Zadeh N, Maddahian B. Identifying Executive Challenges of Performance-Based Payment from Medical and Educational Hospitals Administrators' Perspective and Offering Solutions in Isfahan (2018). EBHPME 2019;3:121-30. https://doi.org/10.18502/jebhpme.v3i2.1223.

[3] Turenne M, Baker R, Pearson J, Cogan C, Mukhopadhyay P, Cope E. Payment reform and health disparities: changes in dialysis modality under the new Medicare dialysis payment system. Health Serv Res 2018;53:1430-57. https://doi.org/10.1111/1475-6773.12713.

[4] Aghajani M, Olyaeemanesh A, Manavi S, Ronasian R, Yusefvand M, Poraghasi L, Maher A, Shahrami A, Kolivand P, Tabatabaei M, Kermanchi J, Babaei F, Vaezi H, Zangeneh M, Dehghani A, Hosseini SS. Evaluating the effectiveness and process of implementation of the new payment-based performance model in compared to the new system of hospitals administration in the health transformation plan. Hakim Health Sys Res 2018;20:213-25.

[5] Ghaedi H, Dost ER, Ghanei M, Razeghi A, Kalani N, Akbari H. A cross-sectional descriptive study on performance-based payment and the respective satisfaction on diagnosis, therapeutic and support-staffs of Jahrom hospitals. Ambient Sci 2018;5:84-9. https://doi.org/10.21276/ambi.2018.05.sp1.ra08

[6] Lin TK, Werner K, Witter S, Alluhidan M, Alghaith T, Hamza MM, Herbst CH, Alazemi N. Individual performance-based incentives for health care workers in Organisation for Economic Co-operation and Development member countries: a systematic literature review. Health Policy 2022;126:512-21. https://doi.org/10.1016/j.healthpol.2022.03.016.

[7] Slotkin JR, Ross OA, Newman ED, Comrey JL, Watson V, Lee RV, Brosious MM, Gerrity G, Davis SM, Paul J, Miller EL, Feinberg DT, Toms SA. Episode-based payment and direct employer purchasing of healthcare services: recent bundled payment innovations and the Geisinger Health System experience. Neurosurgery 2017;80:S50-8. https://doi.org/10.1093/neuros/nyx004.

[8] Kondo KK, Damberg CL, Mendelson A, Motu'apuaka M, Freeman M, O'Neil M, Relevo R, Kansagara D. Implementation processes and pay for performance in healthcare: a systematic review. J Gen Intern Med 2016;31:61-9. https://doi.org/10.1007/s11606-015-3567-0.

[9] Shon C, You M. Evaluation of health policy governance in the introduction of the new DRG-based hospital payment system from interviews with policy elites in South Korea. Int J Environ Res Public Health 2020;17:3757. https://doi.org/10.3390/ijerph17113757.

[10] World Health Organization. Operational framework for monitoring social determinants of health equity. Available at: https://www.who.int/publications/i/item/9789240088320 (Accessed on: 20/09/24).

[11] Campbell SM, Kontopantelis E, Reeves D, Valderas JM, Gaehl E, Small N, Roland MO. Changes in patient experiences of primary care during health service reforms in England between 2003 and 2007. Ann Fam Med 2010;8:499-506. https://doi.org/10.1370/afm.1145.

[12] Millett C, Gray J, Saxena S, Netuveli G, Majeed A. Impact of a pay-for-performance incentive on support for smoking cessation and on smoking prevalence among people with diabetes. Cmaj 2007;176:1705-10. https://doi.org/10.1503/cmaj.061556.

[13] Scott IA. Pay for performance in health care: strategic issues for Australian experiments. MJA 2007;187:31-5. https://doi.org/10.5694/j.1326-5377.2007.tb01111.x.

[14] Eghbali Zarch ME, Montazeralfaraj R, Shamsi F, Pakdaman M, Taheri G, Aghily M, Bahrami MA. Feasibility of Telemedicine Deployment in Major Public Hospitals: A Case Study in Yazd. Evidence Based Health Policy, Management & Economics 2017;1:94-102.

[15] Kahn JM, Scales DC, Au DH, Carson SS, Curtis JR, Dudley RA, Iwashyna TJ, Krishnan JA, Maurer JR, Mularski R. An

official American Thoracic Society policy statement: pay-for-performance in pulmonary, critical care, and sleep medicine. Am J Respir Crit Care Med 2010;181:752-61. https://doi.org/10.1164/rccm.200903-0450ST.

[16] Shami R, Gholamzadeh D, Vedadi A. Explaining the Performance-based Payment Model with an Educational Approach in Iranian Educational and Medical Centers and its Comparison with the Existing Models in the Health Care System of the Countries Implementing this scheme. JMED 2020;13:15-30. https://doi.org/10.29252/edcj.13.37.13.

[17] Sharifi T, Hosseini S-E, Mohammadpour S, Javan-Noughabi J, Ebrahimipour H, Hooshmand E. Quality assessment of services provided by health centers in Mashhad, Iran: SERVQUAL versus HEALTHQUAL scales. BMC Health Serv Res 2021;21:397. https://doi.org/10.1186/s12913-021-06405-4.

[18] Aghily M, Bahrami MA, Montazeralfaraj R, Eshrati B, Eghbali Zarch ME. Effect of relationships' quality on patients' loyalty in selected state hospitals. EBHPME 2017;1:33-9.

[19] Teddlie C, Yu F. Mixed methods sampling: A typology with examples. J. Mix. Methods Res 2007;1:77-100. https://doi.org/10.1177/1558689806292430.

[20] Shakir M, Armstrong K, Wasfy JH. Could pay-for-performance worsen health disparities? J Gen Intern Med 2018;33:567-9. https://doi.org/10.1007/s11606-017-4243-3.

[21] Park J. What makes performance-related pay effective in the public sector? Target, pay design, and context. Rev Public Pers Adm 2022;42:416-43. https://doi.org/10.1177/0734371X21990722.

[22] Mehrotra A, Pearson SD, Coltin KL, Kleinman KP, Singer JA, Rabson B, Schneider EC. The response of physician groups to P4P incentives. Am J Manag Care 2007;13:249-55.

[23] Chalmers LM, Ashton T, Tenbensel T. Measuring and managing health system performance: An update from New Zealand. Health Policy 2017;121:831-5. https://doi.org/10.1016/j.healthpol.2017.05.012.

[24] Ertok M. Evaluation of a Pay for Performance Scheme in Maternity Care: The Commissioning Quality and Innovation Payment Framework in England. Procedia Soc Behav Sci 2015;195:93-102. https://doi.org/10.1016/j.sbspro.2015.06.333.

[25] Glickman SW, Schulman KA, Peterson ED, Hocker MB, Cairns CB. Evidence-based perspectives on pay for performance and quality of patient care and outcomes in emergency medicine. Ann Emerg Med 2008;51:622-31. https://doi.org/10.1016/j.annemergmed.2008.01.010.

[26] Sikka R. Pay for performance in emergency medicine. Ann Emerg Med 2007;49:756-61. https://doi.org/10.1016/j.annemergmed.2006.06.032.

[27] Habicht T, Habicht J, van Ginneken E. Strategic purchasing reform in Estonia: reducing inequalities in access while improving care concentration and quality. Health policy 2015;119:1011-6. https://doi.org/10.1016/j.healthpol.2015.06.002.

[28] Eijkenaar F. Key issues in the design of pay for performance programs. Eur J Health Econ 2013;14:117-31. https://doi.org/10.1007/s10198-011-0347-6.

[29] Krauth C, Liersch S, Jensen S, Amelung VE. Would German physicians opt for pay-for-performance programs? A willingness-to-accept experiment in a large general practitioners' sample. Health Policy 2016;120:148-58. https://doi.org/10.1016/j.healthpol.2016.01.009.

[30] Smoldt RK, Cortese DA, editors. Pay-for-performance or pay for value? Mayo Clin Proc 2007;82:210-3.

[31] Ali M, Sarvanaz T. A model for calculating the amount of incentive payments to employees using multi-criteria decisions. JIMS 2012;8:101-28.

[32] Gheibi R, Tehrani PN, Dolatabad MA, Alihosseini S, Aryankhesal A. Staff satisfaction level of the performance-based payment plan (Qasedak) in hospitals of Iran university of medical sciences: 2019. JHA 2021;23:70-80. https://doi.org/10.29252/JHA.23.4.70.

[33] Iezadi S, Tabrizi JS, Ghiasi A, Farahbakhsh M, Gholipour K. Improvement of the quality payment program by improving data reporting process: an action research. BMC Health Serv Res 2018;18:1-10. https://doi.org/10.1186/s12913-018-3472-4.

[34] Gravelle H, Sutton M, Ma A. Doctor behaviour under a pay for performance contract: treating, cheating and case finding? OUP 2010;120:F129-56. https://doi.org/10.1111/j.1468-0297.2009.02340.x.

[35] Peterson ED. Should we link payment to quality? Am Heart J 2004;148:S56-8. https://doi.org/10.1016/j.ahj.2004.09.018.

[36] Forstater A, Hojat M, Chauan N, Allen A, Schmidt S, Brigham J, Lopez BL, Christopher M, Christopher A. 274 Does Patient Perception of Physician Empathy Affect Patient Compliance in the Emergency Department? Ann Emerg Med 2012;60:S98. https://doi.org/10.1016/j.annemergmed.2012.06.252.

[37] Akhavan Behbahani A, Esmaily I. Supplier-induced demand (SID) for medical services by Iranian physicians (policymaking and controlling). Majlis and Rahbord 2019;25:321-43.

Received on January 2, 2025. Accepted on January 16, 2025.

Correspondence: Hamid Pourasghari, Department of Health Services Management, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran. E-mail: Pourasghari.h@iums.ac.ir

How to cite this article: Eghbali ME, Gorji HA, Arabloo J, Martini M, Behzadifar M, Pourasghari H. Global Disparities in Colorectal Cancer: Unveiling the Present Landscape of Incidence and Mortality Rates, Analyzing Geographical Variances, and Assessing the Human Development Index. J Prev Med Hyg 2025;66:E126-E137. https://doi.org/10.15167/2421-4248/jpmh2025.66.1.3497